ICCAGRA Meeting

NASA Airborne Science Program Update

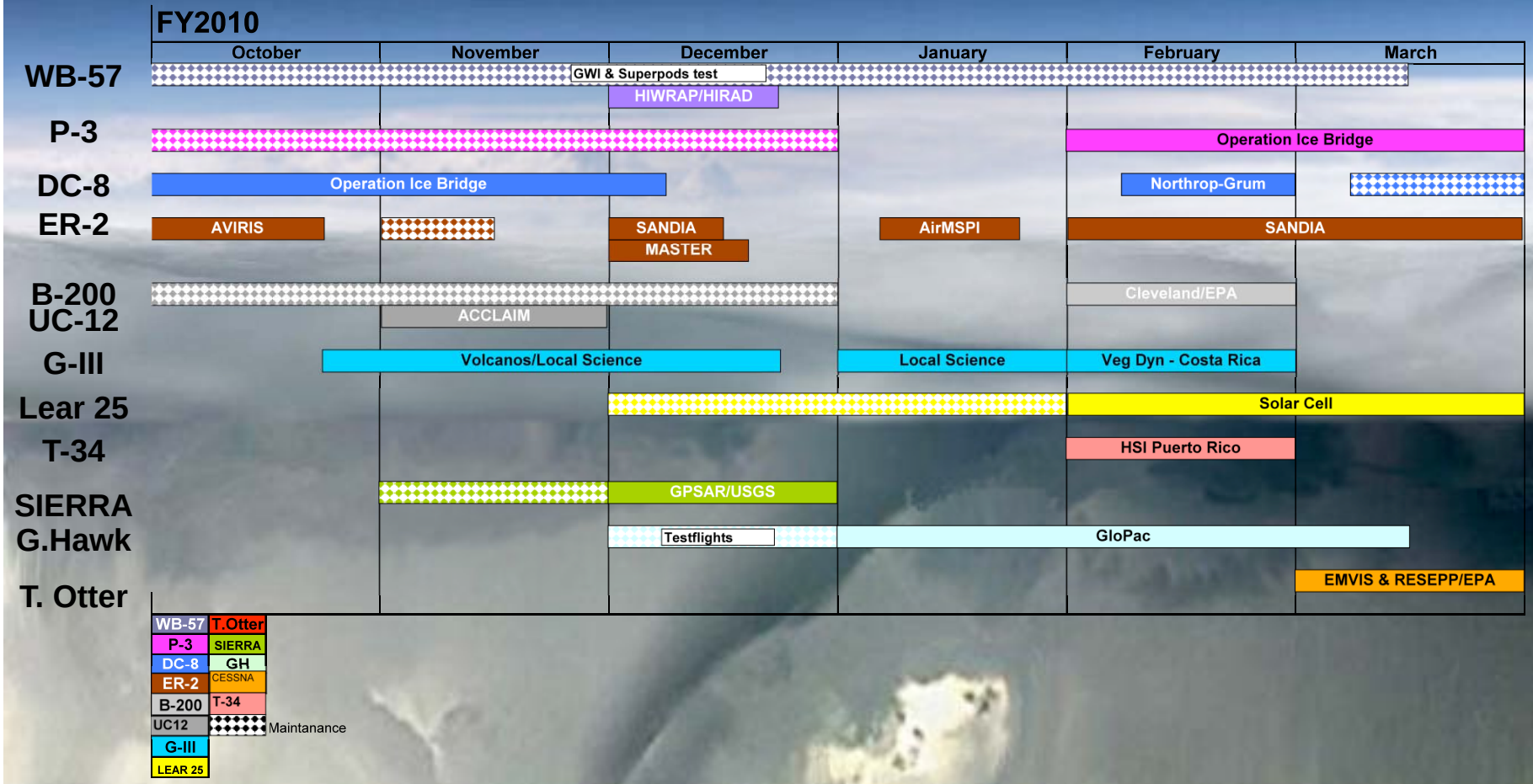
November 9, 2009

Airborne Science Program Direction

Program Changes and Direction:

- Program Director Change
- Next Generation Programs
  - SARP
  - AREE
  - HOPE
- Missions
  - IPY
  - UAVSAR
  - GloPac
  - Ice Bridge
- Program Investments
  - Heavy Lift
  - SatCom
  - WB-57 GWI & Superpods
  - American Recovery and Reinvestment Act
- Earth Venture Initiative

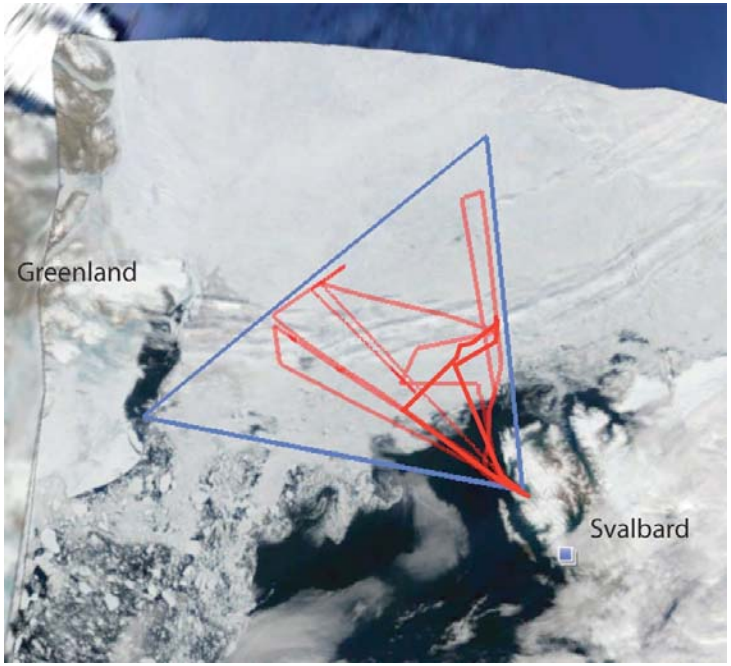
Platform Schedule



Note: Schedule current as of 10-19-09

IPY - CASIE

- Characterization of Arctic Sea Ice Experiment
- July 2009
- 11 flights
  - providing data over 2523 km of the ice pack
- 9 to 10 hours flight duration
- Flight altitudes typically between 150 and 300m



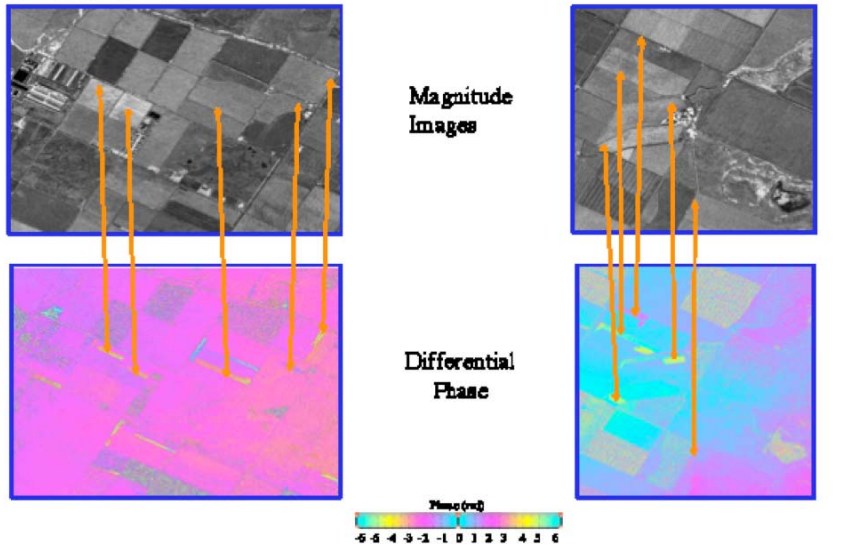
Payload:

- CU LIDAR and Imaging System (CULPIS) consisting of 2 laser altimeters
- GPS
- IMU
- Pressure sensors
- 2 Canon G10 digital cameras
- MicroASAR C-band imaging radar
- Video camera
- Up- and down-looking Kipp and Zonen pyranometers
- Upand down-looking Ocean Optics spectrometer
- 2 down-looking Heitronics KT-11 pyrometers
- Meteorological sensors (temperature, pressure and humidity)
- Icing sensor consisting of humidity and temperature sensors
- RaptorEye forward-looking video camera.

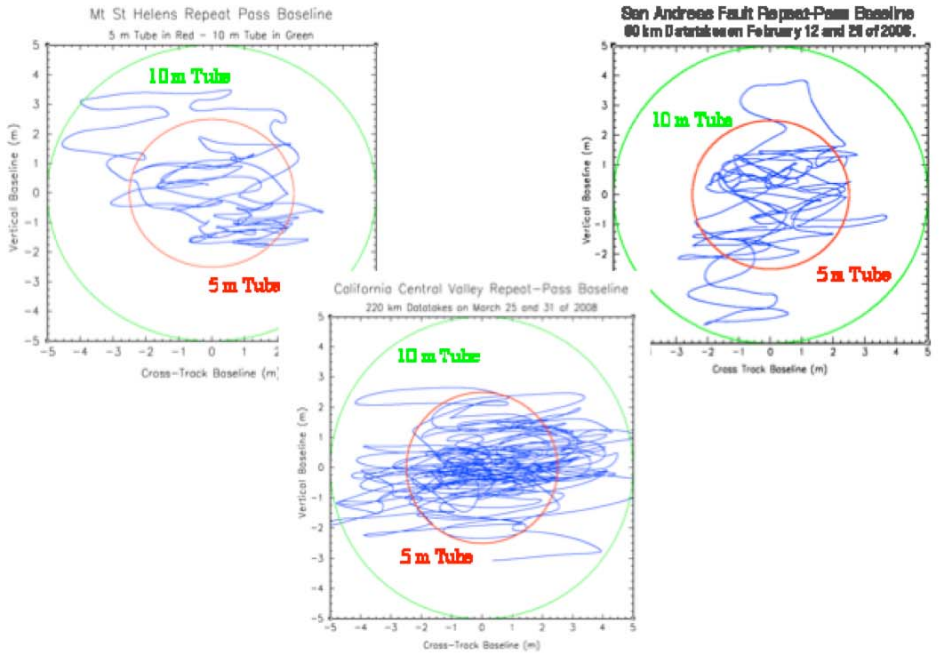
UAVSAR

Deformation in California Central Valley

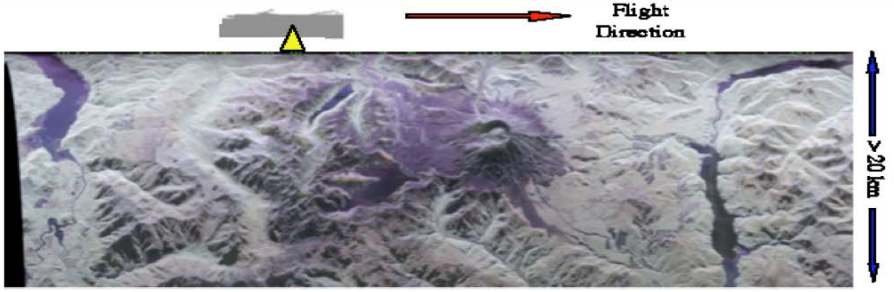
- Expansion of the soils do to watering can be observed in the phase differences. One cycle of phase change corresponds to 6 cm of deformation. Observed deformation on the order of 1-2 cm.



Example Repeat Pass Baselines



Mt St Helens - UAVSAR March 24, 2008

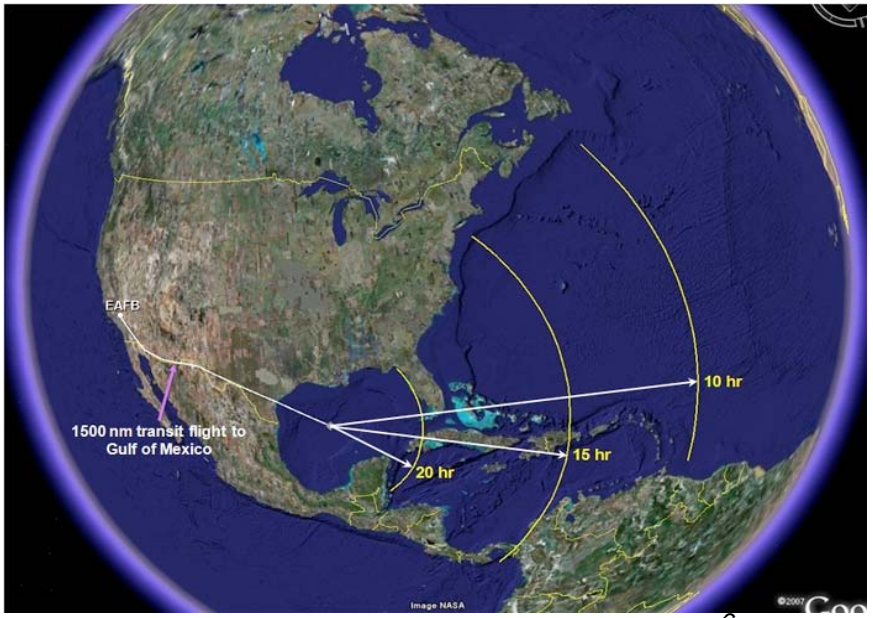


- Fully polarimetric image of Mt St Helens collected on March 24, 2008 by the UAVSAR radar. A second acquisition was collected on March 31, 2008.

NASA Global Hawk Status
November 7, 2009

- The Space Act Agreement w/NG working.
- Three successful flights with NASA 872
- First civil Global Hawk pilot qualified (NOAA's CDR Phil Hall)
- NASA in discussion w/AF to acquire AV7.
- First science missions (GloPac) scheduled for late January - March

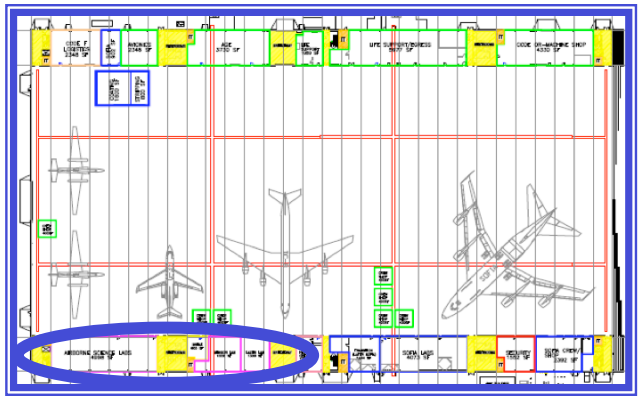
Range	>11,000 nmi
Endurance	>31.5 hours
Maximum Altitude	65,000 feet
Gross Weight	26,750 lbs
Fuel Capacity	15,300 lbs
True Airspeed	335 knots
Payload Weight	2000 lbs
Payload Power	10 kVA
Payload Volume	>100 ft3
Airfield requirement	8,000 x 150 feet
Engine	AE-3007H
Fuel	JP-8
AV-1	<600 flight hours
AV-6	<200 flight hours
Autonomous all phases of flight	



On-Station Times in the Gulf/Atlantic Region

Airborne Science
Capability Additions and Program Stabilization

NASA Airborne Science Facility in Palmdale



NASA Dryden Flight Research Center Photo Collection
http://www.dfrc.nasa.gov/Gallery/Photo/index.html
NASA Photo: ED08–0022–01 Date: January 17, 2008 Photo By: Tom Tschida

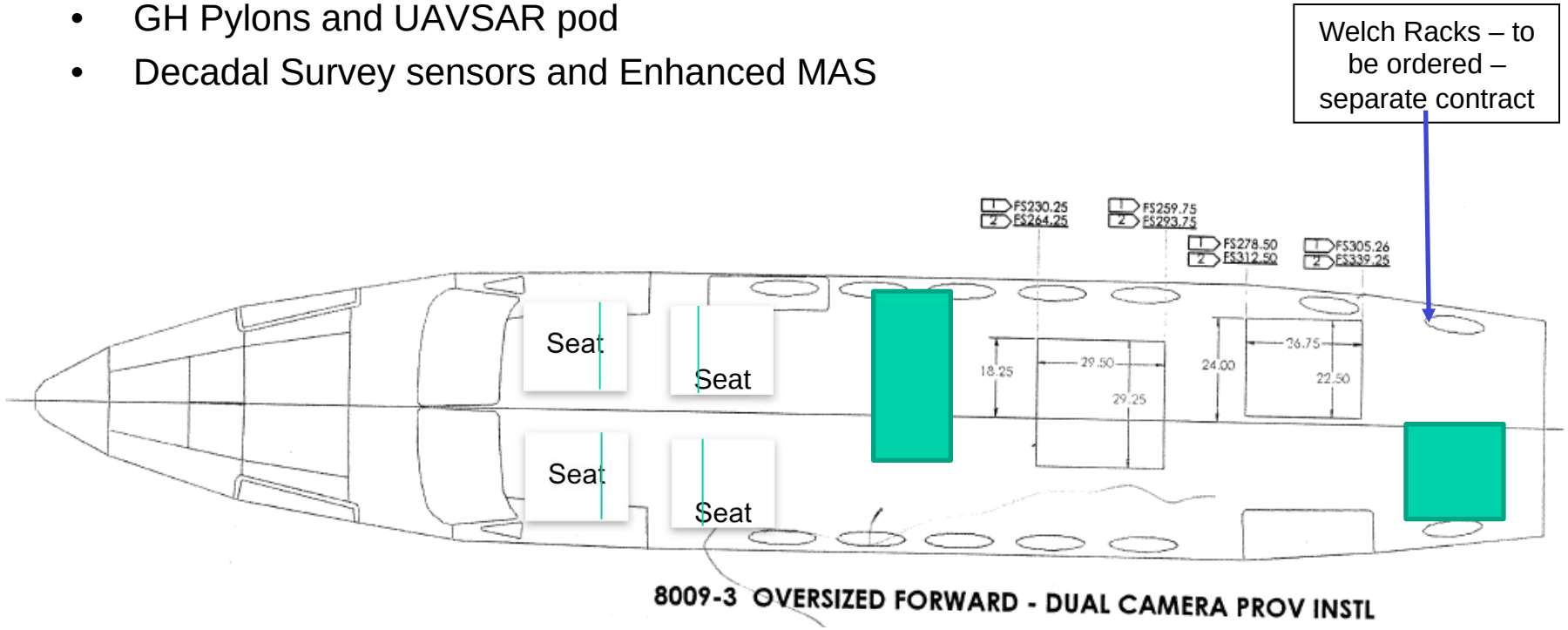
The Dryden Aircraft Operations Facility in Palmdale, Calif., is now home to two large science aircraft, NASA's SOFIA observatory and a DC–8 science laboratory.

WB-57 Upgrades

- Superpod Pylons completed & being integrated
- Main landing gear gross weight increase analysis completed
- Structure gross weight increase in progress

NASA American Recovery and Reinvestment Act

- WB-57 Aileron refurbishment
- P-3B Autopilot and Avionics Upgrade
- B-200 Payload
- DC-8 Low Utilization Maintenance Program initiation
- Payload support systems standardization (high altitude aircraft)
- Dryden Aircraft Operations Facility (ER-2 life support, science labs, administrative support areas)
- GH Pylons and UAVSAR pod
- Decadal Survey sensors and Enhanced MAS



Aircraft Catalog
Blanket Purchase Agreements (BPA)

- Blanket Purchase Agreement respondents have come in. An unprecedented 12 companies offering dozens of aircraft are included:
  - **Heavy Lift Aircraft**
    - **L-1011**
  - **Medium Lift Aircraft**
    - **B-200**
    - **G-1**
    - **Twin Otter**
    - **SAAB 340**
    - **OV-1**
  - **Light Aircraft**
    - **Archer**
  - **Unmanned Aircraft**
- BPA award
- Paid for on a per mission basis. No recurring leases, no contract minimum

ESSP Program: Venture Class

- Venture Class missions within the ESSP program will be aligned to the recommendations of the National Academy of Science 2007 Decadal Survey:
  - Restore more frequent launch opportunities
  - Focus:
    - Foster revolutionary innovation
    - Facilitate the demonstration of innovative ideas and higher-risk technologies
    - Establish new research avenues
    - Demonstrate key application-oriented measurements
  - May include:
    - stand-alone missions that use simple, small instruments, spacecraft, and launch vehicles;
    - more complex instruments of opportunity flown on partner spacecraft and launch vehicles; or
    - complex sets of instruments flown on suitable suborbital platforms
  - ***"…Key to the success …will be maintaining a steady stream of opportunities for community participation in the development of innovative ideas, which requires that strict schedule and cost guidelines be enforced …"***

Venture-class in NASA Earth Science

- NRC Decadal Survey recommended a “Venture Class” line of small, cost- and schedule-constrained, competitively selected “missions” to complement the identified strategic missions
  - Introduces competition and intellectual flexibility into the full Earth Science program, complementing the set identified missions
  - Cost is reasonably well constrained in the Decadal Survey
  - ***Features of a Venture-class mission line in Earth Science***
    - Yearly calls for Venture-class missions as recommended by the NRC decadal survey
    - Incorporate an optimal mix of space-based, suborbital, balloons and sounding rocket missions
    - Opportunities for space-based missions should place no restriction on possible overlaps with decadal survey strategic missions
    - ***Missions should be ready for a launch readiness date of 2014 with a two-year readiness cycle***

Upcoming Events

- **Major Upcoming Activity:**

  - Ongoing – UAVSAR, G-III
  - Jan-Mar 10 – GloPac, Global Hawk
  - Mar 10 – Ice Bridge Greenland 2010, P-3, DC-8
  - Apr 10 – WB-57 GWI and Superpods, WB-57
  - Jun-Jul 10 - SARP
  - Aug-Sept 10 – GRIP, DC-8, Global Hawk
  - Oct 10 – Ice Bridge Antarctica 2010, DC-8
  - Mar 11 – Ice Bridge Greenland 2011, P-3, DC-8
  - Oct 10 – Ice Bridge Antarctica 2011, DC-8
  - Jan 12 – PAC3E Guam/SE Asia, DC-8, WB-57/ER-2